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ABSTRACT

Prepared by the Statewide Automation Committee of the New York State Education Department, this plan outlines strategic directions for library automation development in New York, as supported by state and federal funds, through the year 1989. This plan comprises 20 recommendations for accomplishing a three-part automation program: (1) statewide database, (2) library network linking, and (3) consulting and training. Goals, assumptions, and principles assumed for implementing the plan are presented, and the report concludes with a discussion of the priorities recommended by the committee and a list of the committee members. (RP)

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Libraries & Technology

A Strategic Plan for the Use of Advanced Technologies for Library Resource Sharing in New York State

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1987

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Libraries & Technology

A Strategic Plan for the Use of Advanced Technologies for Library Resource Sharing in New York State

Prepared by The Statewide Automation Committee

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ROBERT BARRON

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Introduction

This is a plan outlining strategic directions for library automation development in New York, as supported by State and Federal funds, through the year 1989.

In 1986, the Regents adopted a three-part program for automation, "Library Resources Sharing in New York State and Technological Change," in *Library Service to the People of New York State*. This program calls for:

- Continued development of a statewide *database* of machine-readable bibliographic and nonbibliographic records resident in several computer systems and utilities with the expectation of linking these regionally, statewide, and nationally;
- A statewide library *network* to link local and regional systems, to provide access to national networks, and to provide integrated services using the library database and communications network;
- A strong and formal automation *consulting* capability within the State Library, and through an informal network of practitioners in the State.

In April 1986, the Director of the Library Development Division appointed a 16-member Statewide Automation Committee broadly representative of automation concerns in all types and levels of libraries. The Committee was asked to review a 1984 draft automation plan (upon which the 1986 Regents program was based) and develop plans for accomplishing the three-part automation program. The Committee has broadly elicited input and developed twenty recommendations. Background on these recommendations is on pages 12–17 of this report.

Recommendations

GENERAL RECOMMENDATIONS

1. Develop operational and financial plan

In order to ensure that the strategic goals of this plan are met, an operational plan with estimated costs of implementation shall be developed by a Phase II Committee with the Library Development Division staff, appropriate consultant help and the participation of other relevant state-level agencies.

2. Take leadership role in telecommunication

The Library Development Division, a Library Telecommunications Task Force, and other library leaders must participate in the development of a state-financed or state-assisted telecommunications network, assuming a leadership role, so the State's libraries can effectively participate in and take full advantage of such development.

3. Convene biennial review committee

The Library Development Division should convene a committee biennially to review administrative and technological progress on the statewide automation plan and recommend updating and revision.

DATABASE RECOMMENDATIONS

4. Facilitate access to defined database

For purposes of library automation planning, the statewide database is defined as the aggregate of machine readable records describing and locating materials in all physical data storage media and formats in New York institutions and support files. While issues of records ownership may affect database integration and linkage, the State goal is to facilitate global and inclusive access to the totality of such records.

5. Provide state-level leadership

Leadership in statewide database investment decisions should be provided by the Library Development Division, even though the program is in large part regionally administered. The Library Development Division and the regions should be guided by the priorities recommended in this automation plan.

6. Ensure balanced development

Continued statewide database development efforts should give high priority to ensuring the inclusion of a reasonable balance of unique items, scarce items, ubiquitous items, and high demand items within the statewide database.

7. Develop criteria for balance

The criteria which define reasonable balance include the likelihood of use of materials represented in the database both locally and for interlibrary loan, the value to the State's program of economic development, the contribution to

research and scholarship in all disciplines, and the numbers of users in all types of libraries served by the database.

8. Ensure access and local commitment
Institutions that use public funds for database development must ensure ongoing commitment from local funds for entry of current materials, ensure continuing maintenance and security of the database, and provide access to the materials listed in the database within defined performance standards.

LINKING RECOMMENDATIONS

9. Constitute Linkage Standards Task Force
The Library Development Division should constitute a Linkage Standards Task Force including representation of libraries in the State and technical advisers to recommend standards and specifications for enabling computer systems and system components to communicate and exchange information.

10. Adopt ISO/OSI standards
These standards should conform to the International Standards Organization/ Open Systems Interconnection (ISO/OSI) reference model and should be adopted by New York State.

11. Support linkage efforts
The Library Development Division should pursue and support programs to link systems and system components consistent with national efforts such as the Linked System Project (LSP).

12. Test and verify specific systems
The Library Development Division should have the capacity to test specific systems offered by vendors and verify that they meet these New York State standards.

13. Include offline databases
Plans for a statewide network must recognize the continuing importance of offline databases and the probability that some human intermediation will be needed to access these records.

CONSULTING AND TRAINING RECOMMENDATIONS

14. Develop automation training database
The Library Development Division should develop an interactive online database of providers of library automation training and consultant services.

15. Dispense vendor information
The Library Development Division should seek and dispense technical information about vendors which do and do not meet international and national standards for bibliographic records, telecommunications standards and linking capabilities.

16. Identify needs and sponsor training
All library systems, using intersystem cooperation and resources, should identify needs, sponsor training, introduce new technologies and provide automation information.

17. Provide library school access
Library schools within the State should be provided with access to automation systems developed by the Library Development Division for the statewide database.

18. Support advanced technology internships
Advanced technology internships should be supported by the State Library.

19. Develop training packages

The Library Development Division, using the resources of the Education Department and other external resources, should develop library automation training and support programs using, for example, video, teleconferences, and internships.

20. Obtain deep volume discounts

The possibility of statewide cooperation and negotiation to obtain deep volume discounts on software and hardware should be explored by the Library Development Division and information on discounts should be disseminated to library systems.

Goals

Automation is an important tool for meeting goals of resource sharing, statewide access to information, and cost-effective library operations. Automation planning is an ongoing process involving many people. This document outlines how State aid and Federal aid for technology for libraries will be used to achieve the Regents goal that "every resident of New York State should enjoy timely and free access to a full range of information resources and services through local libraries working within library systems and networks."

Automation is not, in itself, a goal of libraries, but is a means to an end – that of providing library services to a society where computers and advanced communication systems are fundamental to serving the needs of that society. Library goals are the framework within which automation objectives are set. One of the most important concepts in library development in the State has been the acknowledgement of significant local and regional differences. Libraries and library systems have been encouraged to determine and develop their own goals, objectives and service patterns to meet the needs of their areas. Because of the diversity – of users, scope of services, funding sources, locale and geographic scope – libraries sometimes differ as to their goals for themselves and for automation.

At the State level, a number of reasons exist for promoting and aiding automation in the libraries of the State. State level automation goals include facilitating:

a. access to information by all residents of New York State – both to information traditionally available in libraries and to current information and referral services;

b. availability of information for the State's continued economic development;

c. resource sharing by libraries within the State;

d. cost-effective library operations in New York, guaranteeing optimum benefit from State and Federal funds;

e. access to information outside New York via links to other state, regional and national systems.

Context For Resource Sharing and Automation

Library resource sharing in New York State is grounded in the 35 years of systems development. The systems, which cover the entire State, provide the means by which library resources are made available to all residents in the State. These systems, and the State Library, have a long-standing commitment to the use of technology to improve services, increase efficiency, and constrain cost increases. As the 1981 report of the Commissioner's Committee on Statewide Library Development pointed out, however, developments in technology are fundamentally changing library services. The effective use of computer and communications technology will enable libraries in New York to affect the welfare of the State dramatically. The ability to locate and deliver information needed by individuals and by business, industry, and government is vital to the State's economic and social well-being.

New York has pioneered development of automated library systems and has creatively used national databases and developments to advance library service. Through December 1986, the State Library Division of Library Development has provided $13.3 million in State and Federal grants to support automation programs at the State, regional, and local levels. MARC and other technical standards have been used in these programs since 1978. Since 1980, the State Library has supported the systematic use of OCLC and other databases in building a statewide machine-readable union list of serials. The Regional Bibliographic Data Bases and Interlibrary Resources Sharing Program, approved by the Legislature in 1984, requires library systems in each of the nine regions of the State to develop a plan for a regional database which meets national and State standards, thus providing a means by which any library in New York State can identify bibliographic and holdings records throughout the State.

In December 1984, as a requirement of the regional database program, the systems completed data conversion plans for the 1985-89 period. The plans and reports subsequently filed identify a universe of 65 million monographic holdings records. Approximately 32 percent, or 21 million of these records, are now in machine-readable form. Some 800,000 serials database records, or 72 percent of the estimated 1.1 million records, are in machine-readable form. There now exist in New York a variety of automated networks, a rapidly increasing resource of library computer expertise, and a steadily growing database.

Diversity of networks and regional development within a statewide program have been generally advantageous because they have cost-effectively enlarged the base for resource sharing and have begun to meet the changing needs of various library regions and their clientele. The recognition of shared goals and the commonality of much of the information to be handled has also

been realized. Early automation developments in the State enhanced the available mechanisms for resource sharing and reaching common goals. Standards for machine-readable bibliographic records were agreed on early and are widely supported and used; this provides the opportunity for interaction between various automated systems, for the exchange of data, and for machine-to-machine communication.

Much remains to be done. While the machine-readable records in New York generally conform to accepted standards, they exist in various computer databases and in a growing number of local data files produced by private vendors for contracting libraries in New York; there are a variety of manufacturers and vendors and a wide range of available hardware, software, and bibliographic services currently in use in the State's libraries. The number of commercial vendors, the scope of their services, and the integrated library systems and telecommunications packages available from them is ever increasing. These vendors will play an increasingly important role in resource sharing in New York State. The ready interconnection of systems and system components (yet to be achieved) remains a key element in resource sharing. As important, libraries and library systems are making decisions that will affect automation and services for years to come.

Among the national and statewide resources upon which future automation progress will be built are the following membership and publicly funded organizations*:

OCLC (Online Computer Library Center), a shared bibliographic system based in Ohio, serving 7,413 libraries of which 264 are in New York State, with a database exceeding 15 million records and 233 million item locations. The database includes 20 million item locations for New York State libraries plus 120,000 serial records and 850,000 serial item locations.

RLIN (Research Libraries Information Network), a national online database of 5 million records with locations in 36 member research libraries, nine of which are located in New York, and have combined holdings that exceed 26 million volumes.

MILCS (Metropolitan Interlibrary Cooperative System), a New York Public Library-based system of 3 million titles and 15 million locations maintained on LIONS (Library Information and On-line Network Service), for holdings of Brooklyn, 82 New York Public Library branches, Queens Borough Public Library, New York City school libraries, and academic and public libraries in Nassau, Suffolk and Westchester Counties.

RML (Regional Medical Library Network), a federally funded online network with a link to NYSILL, providing access to specialized health resources under contract between the New York Academy of Medicine, the National Library of Medicine, five New York resource libraries, and 15 area libraries that process nearly 210,000 requests annually.

NYSL (New York State Library), the online catalog is used both on-site and for the NYSILL computerized library network.

Telecommunications developments are probably changing as rapidly as other aspects of technology. Various combinations of online and offline databases are being used by the regions. Library planners are involved in Technology

* Statistics, as of March, 1987

Network Ties, NYSERNET, SUNYNET, and other New York State developments which have implications for library resource sharing.

Technology Network Ties (TNT) aims to create a single, comprehensive, integrated education network for management and instructional services covering the entire State. TNT, which was established in 1985 legislation, will supersede the Education Department's New York State School Computer Services System (NYSSCSS) which has served BOCES and school districts since the 1970's. NYSSCSS is one of several education networks operating within the State more or less independently of one another. TNT will replace some of those existing networks and establish new connections among educational agencies, thereby helping to control telecommunications costs and provide increased services to all educational institutions, including libraries.

The initial funding provided for a 1985/86 pilot program to develop a high-speed electronic network to link three BOCES Regional Information Centers (Madison-Oneida, Onondaga, and Broome) with the State Education Department computer in Albany. Four other Regional Information Centers (Albany, Erie, Suffolk, and New York City) are being added to the backbone and a regional network in the Madison-Oneida Regional Information Center is being developed in 1986/87. The Education Department is requesting funds for additional development in 1987/88.

NYSERNET is a high-speed network connecting New York State's research universities and other selected laboratories in early 1987. The National Science Foundation, which aims to build supercomputer facilities for the academic research community and to provide network access to those facilities for all NSF-supported researchers, has awarded a grant to Cornell University to fund the supercomputer center for NYSERNET. Phase I, started in January 1987, includes Cornell, the University of Rochester, Rensselaer Polytechnic Institute, New York University, Columbia University, SUNY at Stony Brook, and a research institute in Albany. Phase II will expand the network to include CUNY, the SUNY campuses at Albany, Binghamton, and Buffalo, Syracuse University, Clarkson University, Polytechnic Institute of New York, Rockefeller University, and Brookhaven National Laboratory. Cornell will establish a connection with the New Jersey supercomputer center at Princeton University and ultimately participate in a national supercomputer access network, called NSFNET, connecting the supercomputer centers to each other and to state and regional networks.

The State University of New York's statewide data communications network, SUNYNET, which was established in fiscal year 1985/86, has two major goals: to increase the opportunity of sharing data, software, unique computing and other resources among the campuses and users of the State University of New York, and to reduce the geographic barrier between campuses by connecting people in an electronic mail and message system.

Objectives of the initial phase of SUNYNET are to: (1) Provide a full-function, high-speed/high-capacity network to connect the four University Centers and Central Administration; (2) Connect the 17 "Burroughs" campuses with the backbone network; and (3) Replace the several existing administrative and academic data networks with this high-capacity, full-function network. In the short term, SUNYNET should significantly improve communication among the SUNY campuses with little, if any, real increase in operations cost over existing networks. In the longer run, SUNYNET should facilitate SUNY's linkages with external educational networks.

The Governor's "Electronic Highway" is a popular name for a proposed statewide fiber optics network. Fiber optics technology will make possible sophisticated statewide network development because it will permit the trans-

mission of enormous quantities of information at extremely high rates of speed. Thousands of simultaneous voice, video, and data transmissions can be carried on one line at rates up to 1,000 times faster than most current data lines.

The New York Network, under the State University of New York, which serves the nine public television stations in New York, is installing a satellite uplink which has significant statewide telecommunications implications. This capacity will be able to serve a variety of application areas including: voice, data and video support for New York's libraries. Ultimately, strategically located uplinks and downlinks in New York State, combined with the regional network capacities as described above, could evolve to a highly sophisticated network capable of serving a variety of library telecommunications needs.

Assumptions and Principles

ASSUMPTIONS

This plan is based upon assumptions derived from prior experience with library automation, from current problems in library automation, and from observations of trends affecting libraries.

(1) There will continue to be diversity in approaches to automation, regardless of state policies and regardless of how much public money can be applied to the use of technology.

(2) There will continue to be rapid development in technology: some costs will come down, others will rise, and capabilities at each general cost level will increase.

(3) Technology will become as much a part of everyday operations of libraries as manual systems are now, to the point where, eventually, every library in New York will be able to implement or have access to an integrated computer library system.

(4) Library users will continue to become more sophisticated in the use of computers, especially microcomputers; eventually most users will make daily use of such computers and will expect some portion of that use to include remote access to library databases, information and services.

(5) There will continue to be State and Federal dollars available at current or somewhat increased levels and the governments which provide these dollars will expect coordination and cooperation leading to resource sharing.

(6) The proposed Library Telecommunications Task Force, in conjunction with State Library staff, will determine the best mechanism for assuring participation in statewide telecommunications development and encourage cooperative network development within the library community.

(7) Continuing and significant changes in technology, political environment, and availability of financial resources will require modifications to this plan from time to time.

(8) Libraries are and will continue to use advanced technology to generate data useful to library management and decision-making.

PRINCIPLES

Experience in automation with Library Services and Construction Act (LSCA) grants and with the regional database program demonstrated the significance of ten principles which continue to be important. These principles are that the libraries in New York should:

(1) ensure compatibility of data by adhering to national standards;

(2) build upon machine-readable data already available to decrease costs of data conversion and system implementation;

(3) generate current machine-readable data as a by-product of day-to-day library operations;

(4) target State and Library Services and Construction Act funds on programs and projects that facilitate broad scale regional and statewide resource sharing and demonstrate a strong local and system commitment to automation;

(5) budget local funds for automated library operations (just as they now budget for manual functions and activities) which may be supplemented by State and LSCA funds as in (4) above;

(6) recognize that bibliographic data generated with public funds should be freely available for regional or statewide use;

(7) ensure that all types of libraries have equal access to such bibliographic data;

(8) recognize that each of the major utilities and automated systems will have unique records for materials that will be needed by users of other automated systems;

(9) provide access to the developing national and multi-state networks such as OCLC, RLIN, SOLINET, and WLN;

(10) recognize that bibliographic database development is not an end in itself and that the principal goal is to provide access to information resources for users.

The State supports regional automation programs because they improve services provided by libraries that are members of systems. The State Library and the networks provide services which are of a statewide and regional nature and which are not practical to provide locally. The State Library serves as the catalyst and unifying factor for access, communication and interaction among the different library, automation, and telecommunication systems within the State.

The State's financial assistance, within priorities outlined later in the plan, will emphasize continued development of the database, linking of databases, transferability of systems and data, and interlibrary resource sharing. Costs of ongoing automation operations should be budgeted by each library or library system from its own funding sources, and should be supplemented by State and LSCA funding within the context of the following plan, as in the Regional Bibliographic Data Bases and Interlibrary Resources Sharing Program.

The Plan

The Committee believes the three-part program for continued *database* development, a statewide *network* to link components of the database, and *consulting* capability, as defined and discussed in this report, is sound. The Committee has developed twenty recommendations for accomplishing the three-part automation program. Most of these recommendations are presented under the three headings of *Database, Linking,* and *Consulting and Training,* but the Committee's first three recommendations are basic to further action in all three areas:

1. In order to ensure that the strategic goals of this plan are met, an operational plan with estimated costs of implementation shall be developed by a Committee with Library Development Division staff, appropriate consultant help and the participation of other relevant state-level agencies.

This planning document can provide immediate guidance for ongoing regional and local automation efforts while an operational plan is being developed at the state level. The Phase II Committee will include some members of this Statewide Automation Committee, which now has concluded its work, and others who will convert philosophic and strategic goals into specific operational steps.

2. The Library Development Division, a Library Telecommunications Task Force and other library leaders must participate in the development of a state-financed or state-assisted telecommunications network, assuming a leadership role, so the State's libraries can effectively participate in and take full advantage of such development.

State-financed, state-assisted telecommunications programs are vital to accomplish this plan. There are numerous players, many of whom do not yet recognize library interests in these developments. It is essential that the library community be involved in forums in which telecommunications policies and plans are being developed – resulting in a higher profile for library interests. A Library Telecommunications Task Force will undertake the important ongoing work in the area of telecommunications that is vital to the linking recommendations.

3. The Library Development Division should convene a committee biennially to review administration and technological progress on the statewide automation plan and recommend updating and revision.

The Committee emphasizes that the dynamic and rapid pace of current technological change quickly renders planning documents obsolete. At the same time, the administrative infrastructure required to accomplish key recommendations usually matures more slowly. A mandated

review every two years recognizes the dichotomy and therefore the need to monitor commitment and fine tune priorities in any statewide plan for automation for libraries.

DATABASE RECOMMENDATIONS

A machine-readable database encompassing bibliographic, holdings, and related information on the contents of more than 7,700 libraries is a massive undertaking. The concept raises fundamental questions of definition, scope, priorities, use and cost. For the continued development of the database, the Committee makes five basic recommendations.

4. For purposes of library automation planning, the statewide database is defined as the aggregate of machine-readable records describing and locating materials in all physical data storage media and formats in New York institutions and support files. While issues of records ownership may affect database integration and linkage, the State goal is to facilitate global and inclusive access to the totality of such records.

The term "statewide database" constitutes a basic building block of the statewide automation plan. The database comprises:

a) bibliographic information describing collections in institutions in the state, including all physical data storage media (e.g. videotape), and formats, including CONSER (serials);

b) holdings statements providing location data for discrete titles;

c) ancillary data essential for database maintenance and use, such as name authority files or name and address directories;

d) community and data referral information files created by libraries or library agencies.

The database is closely related to commercially produced secondary sources such as abstracting, indexing, and numeric databases to which referral access is purchased by libraries. These databases, when searched, generate requests for materials found in the statewide database for direct on-site access or interlibrary loan request.

Every unique record in the statewide database is supported by at least one holding record. The database exists within the context of the international database as follows: library system; region of the state; New York State; contiguous states; United States; international.

5. Leadership in statewide database investment decisions should be provided by the Library Development Division, even though the program is in large part regionally administered. The Library Development Division and the regions should be guided by the priorities recommended in this automation plan.

The major role the regions play in determining priorities that reflect different regional needs is endorsed. It is an effective means of keeping all libraries, large and small, public, academic, special and school, interested and actively participating in the State's automation program. The Library Development Division's leadership role, the priorities recommended in this plan, and increased use of appraisal procedures at the regional level can mediate competing interests and ensure the feasibility of accomplishing the goals within the available funds.

6. Continued statewide database development efforts should give high priority to ensuring the inclusion of a reasonable balance of unique items, scarce items, ubiquitous items and high demand items within the statewide database.

Unique, scarce, and ubiquitous items are defined in terms of distribution, location, and search expectations: a unique item would be represented by one record in the state in all sources, and fewer than two holdings; a scarce item, less than three records in different sources and fewer than ten holdings; ubiquitous items, more than two records in different sources and more than ten holdings in the state. High demand items may be unique, scarce, or ubiquitous.

7. The criteria which define reasonable balance include the likelihood of use of materials represented in the database both locally and for interlibrary loan, the value to the State's program of economic development, the contribution to research and scholarship in all disciplines, and the numbers of users in all types of libraries served by the database.

While development efforts incorporate the four components of bibliographic records, holdings statements, ancillary data, and information and referral files, funding decisions about the database will be governed by the usefulness of the database, with priority given to user needs. That is, reasonable balance is an attribute that should pertain to the material listed in the database.

Appraisal criteria and procedures which should be used by the region and the State to assess the likelihood of potential use of statewide resources will be developed by a Criteria Task Force to be used as a part of fund application assessment and in planning.

8. Institutions that use public funds for database development must ensure ongoing commitment from local funds for entry of current materials, ensure continuing maintenance and security of the database, and provide access to the materials listed in the database within defined performance standards.

The State's financial assistance for development of the database is intended to facilitate resource sharing and public access to information. Acceptance of public funds by an institution therefore carries a responsibility for maintaining and securing the database and for providing access both to the database and to the materials listed in the database.

Performance standards are suggested as an integral program component of database development investment decisions. The suggested standard or guideline is for a respondent agency to be required to transmit a response to each request within two working days of receipt of the request, with the "standard" met 95 percent of the time for 95 percent of responses. "Transmit" may include a paper response as well as electronic transmission. Performance standards are suggested as inclusionary, not exclusionary, with the state supporting efforts by libraries to meet them.

Access to listed materials, either direct or through some form of resource sharing, is also important. Meeting the legislative and program objectives of the program requires that the public will have access to such converted materials in accord with reasonable conditions established by owning institutions and approved by Library Development Division and/or regional surrogates for such access.

LINKING RECOMMENDATIONS

The linking of computer systems to communicate and exchange information with other computer systems and system components is basic to this plan. Linking mechanisms, standards and issues are under discussion at local, state and national levels. The "Linked Systems Project" of the Library of Congress, the Research Libraries Group, OCLC, and Western Library Network (WLN),

and funded by the Council on Library Resources, should prove helpful to New York State. Linking will be made possible through national efforts and collaboration with vendors. The ultimate resolution will be in large part driven by forces outside New York State.

To capitalize on national developments in achieving this plan, the State Library, with the assistance of a state-level committee and technical advisors, should work closely with other state and national efforts and commercial vendors to ensure that communications standards and library applications software provide (1) the widest possible database access to the State's citizenry, (2) compatibility and transportability of the output from library applications software, and (3) electronic linkage with related public and commercial resources that would enhance the breadth of automated resources available. The Committee makes five basic recommendations for linking.

9. The Library Development Division should constitute a Linkage Standards Task Force including representation of libraries in the State and technical advisers to recommend standards and specifications for enabling computer systems and system components to communicate and exchange information.

Complex problems, costs and objectives are involved in the linking of computer systems. The Library Development Division should use the best advisory resources available to achieve the goal of accessing multiple databases from a single station through computer-to-computer linkage designed to bridge differences among data sources, computer systems presently in use, and application differences among those systems. A means should be developed for assessing the cost/effectiveness of particular linkage mechanisms. The work of the Task Force would include identifying, with wide input from librarians in the State, various classes of linkages to be established and the criteria for judging those linkages. A family of recommended linkages would be devised which vendors and utilities could be encouraged to develop and support.

10. These standards should conform to the International Standards Organization/Open Systems Interconnection (ISO/OSI) reference model and should be adopted by New York State.

More specifically, the specifications should be consistent with the protocols of the Linked System Project Standard Network Interconnection (LSP/SNI) as specified in "SNI Protocol Specifications", available from the Library of Congress. The SNI protocols are based on the ISO/OSI protocols.

The standards being developed in conformance with the seven layers of the ISO/OSI model are the protocols needed for communication among bibliographic utilities, regional systems, local systems and system components. Protocols for the lower three layers of the OSI model have been widely accepted for several years. Protocols for layers 4 and 5 of the OSI model have become standardized and are being increasingly accepted. Protocols for some library applications based on the upper layers are expected to become international standards within a year. The nature of the OSI networking architecture permits implementation and migration to the developing international standard. Interim standards can be adopted and replaced when necessary as national and international work proceeds on the ISO/OSI model. Thus, by adopting the ISO/OSI reference model, libraries in the State can make progress toward interconnecting systems and system components while national efforts proceed.

Local systems will need to be augmented with facilities conforming to the standards in order to effect communication with various systems.

11. The Library Development Division should pursue and support programs to link systems and system components consistent with national efforts such as the Linked System Project (LSP).

National efforts through the Linked Systems Project (LSP), the Library of Congress, the national utilities and cooperating vendors will result in the facilities needed to permit the exchange of bibliographic data. With a commitment to conform to international standards for system interconnections, State efforts will articulate well with national efforts. The prototype system now being tested at New York University is being used to link NYU's local computerized system with the Research Library Information Network (RLIN). To carry out this recommendation, the Library Development Division should require that the standards developed as a result of recommendations 9 and 10 be observed in State-funded projects at the earliest feasible date.

12. The Library Development Division should have the capacity to test specific systems offered by vendors and verify that they meet these New York State standards.

The Library Development Division must be able to review and test whether a vendor's proposed linkage mechanism meets the standards adopted for libraries in New York State. New York State should make use of the Library of Congress's Standard Network Interconnection (SNI) test facility and other qualified facilities to the extent feasible. Vendors should be expected to demonstrate their compliance to national and State standards by using this test.

13. Plans for a statewide network must recognize the continuing importance of offline databases and the probability that some human intermediation will be needed to access these records.

The overwhelming majority of linkages will be online computer to computer linkages. When appropriate, traditional manual facilities may be employed. Centers with bibliographies and indexes of materials not conveniently maintained in machine-readable form may be accessed by human assistance responding to queries via telephone or electronic mail.

CONSULTING AND TRAINING RECOMMENDATIONS

Libraries and library systems involved in automation face complex information needs. The Committee examined various roles of libraries, library systems, library schools and related organizations in meeting these information needs through consulting and training. The Committee makes six recommendations for consulting and training.

14. The Library Development Division should develop an interactive online database of providers of library automation training and consultant services.

An information gathering and referral service is needed to help libraries find help at the most appropriate level. An interactive database should list the consultative and training resources of all systems, the Library Development Division itself, vendors, bibliographic utilities and outside independent consultants. Listing would not constitute endorsement.

15. The Library Development Division should seek and dispense technical information about vendors which do and do not meet international and na-

tional standards for bibliographic records, telecommunications standards, and linking capabilities.

Securing and dispensing technical information is most efficiently done at the state level to minimize duplicative efforts at the regional level. This will allow libraries and library systems to make intelligent, appropriate and cost-effective choices for their automation needs.

16. All library systems, using intersystem cooperation and resources, should identify needs, sponsor training, introduce new technologies and provide automation information.

Because the circumstances and resources of the automation program differ from region to region, particular responsibilities of public library systems, reference and research library resources systems, and school library systems in consulting and training will vary. The regions offer opportunities for intersystem cooperation to meet training needs through automation conferences and workshops, demonstrations, automation information centers, and participation in a statewide bulletin board.

17. Library schools within the State should be provided with access to automation systems developed by the Library Development Division for the statewide database.

Graduate library schools within the State can be encouraged to inform students about the State's programs for automation, resource sharing and database quality control. Library schools should be utilized as demonstration and training sites for new automation systems for accessing the statewide database.

18. Advanced technology internships should be supported by the State Library.

Internships can make effective use of library sites in the State. Beyond their value as opportunities for continuing professional education, advanced technology internships in libraries can provide short-term infusions of specialty skills.

19. The Library Development Division, using the resources of the Education Department and other external resources, should develop library automation training and support programs using, for example, video, teleconferences and internships.

The potentially high cost of developing training curricula and support materials requires the utilization of specialized state-level training resources already in place, such as the Center for Learning Technologies. This level of development enhances the capacity for replication across the State.

20. The possibility of statewide cooperation and negotiation to obtain deep volume discounts on software and hardware should be explored by the Library Development Division and information on discounts should be disseminated to library systems.

State agreements are used effectively by libraries for purchases of office supplies, audiovisual equipment, and other non-library-specific acquisitions. System-level and regional-level negotiated discounts sometimes exceed industry-wide levels. The possibility of extending and improving on regional-level discounts should be explored.

Priorities

Each of the 20 recommendations is important, but some depend upon implementation of others. The Committee recommends the following eight priorities to the Library Development Division, library system directors, planners, and others concerned with automation and resource sharing.

1. Increased funding for automation.
Librarians and others concerned with access to information should support legislation which increases funding for an expanded Regional Bibliographic Data Bases and Interlibrary Resources Sharing Program that addresses urgent equipment, database development, telecommunications and other needs. As State aid for operating library systems (public, school, and reference and research) is increased, administrators and boards should affirm their commitment to financing automation as a part of long-range development. System directors and other library leaders should help local library boards and institution administrators understand the importance of planning for automation as a part of ongoing operations. In addition, the State should invest significantly in the telecommunications infrastructure with a clear avenue for library participation, one result of which would be an improvement in library cost-effectiveness and services.

2. Development of telecommunications services.
Libraries, as vital components of the Governor's priority for education and training, must play a leadership role in the State's emerging telecommunications infrastructure, with the expectation that state-financed or state-assisted telecommunications are vital to library participation in all government-sponsored telecommunications initiatives.

3. Continued development of the statewide database.
The Library Development Division and the regions should place a high priority on continued development of the statewide database with attention to recommendations 4-8. Such continued development as recommended in this plan, and reasonable investment in offline products can appropriately precede major linking efforts, which should be based on recommendations 9-12.

4. Appraisal procedures and criteria for planning.
Implementation of recommendations 5, 6, and 7 requires development of appraisal procedures and instruments. The Criteria Task Force is prepared to develop these over the next months.

5. More effective working relationships among library systems within the regions and between the Library Development Division and the regions.
This plan suggests increased Library Development Division leadership in the Regional Bibliographic Data Bases and Interlibrary Resources Sharing Pro-

gram, recognizing that the program is in large part regionally administered. Successful regional administration will require more effective working relationships among the public library systems, the school library systems, and the reference and research library resources systems in regional planning, decision-making and action. All need to keep in mind the resource sharing purposes of the legislation.

6. Implementation of the Recommendation to establish the Linkage Standards Task Force.

Implementation of recommendations 10 and 11 requires early action on recommendation 9, to constitute a Task Force to recommend standards and specifications for computer-to-computer communication.

7. The Library Development Division should seek and dispense technical information about vendors and standards.

Recommendations 9, 10, 11, and 12 presume strong Library Development Division involvement in securing adherence to standards. As libraries and library systems select vendors, they need sound technical information about the capacity of such vendors to meet international and national standards for bibliographic records, telecommunications standards and linking capabilities.

8. Increased cooperation among the Library Development Division, library systems, library schools, and others to provide expanded consultant and training services needed throughout the State.

Recommendations 14, 15, and 16 make clear the Committee's concern for action by both the Library Development Division, the library systems, etc., to provide needed training and consultation.

The Committee

CHAIR OF THE COMMITTEE:

Dinah Lindauer
Former Assistant Director
Nassau Library System

Beatrice Angus
Coordinator
Madison-Oneida Area BOCES
School Library System

Mary Beth Beidl
Coordinator of Automated
Circulation Services
Brooklyn Public Library

Gregory Benson, Jr.
Director
Center for Learning Technologies

Susan P. Besemer
Director, Reed Library
State University College at Fredonia

Stephen B. Bolton
Consultant
North Country Library System

Ruth Brown Chamberlain
Former Director
Southeastern New York Library
Resources Council (until
December 1986)

Glyn Evans
Assistant Vice Chancellor for
Library Services
SUNY/OCLC Network

Maurice J. Freedman
Director
Westchester Library System

Linda Espenshade Heinemann
Assistant Director for Automation
and Technical Services
Four County Library System

Susan Kallenbach
Director of Technical and
Automated Services
New York University

S. Michael Malinconico
Associate Director for Technical
Services & Automation
The New York Public Library

Wallace D. Mohn
Deputy Director, Budget & Support
Services
Buffalo & Erie County Public
Library

James Morgan
Director of Special Projects
South Central Research Library
Council

Marsha Ra
Director
Library Automation Services
City University of New York

John Richardson
Chief, Catalog Services Division
Suffolk Cooperative Library System

Education Department

Joseph F. Shubert
Assistant Commissioner for
Libraries and State Librarian
The New York State Library

Division of Library Development

Roberta G. Cade
Director of Library Development
The New York State Library

George Messmer
Associate in Library Services
The New York State Library

Fred Smith
Associate in Library Services
The New York State Library

Anne Simon
Assistant in Library Services
The New York State Library